Trend Study 25A-3-04

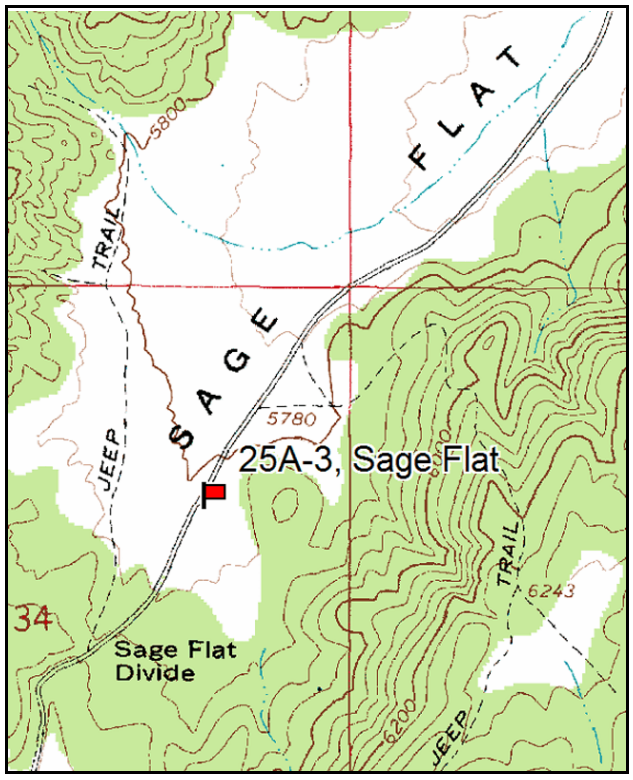
Study site name: Sage Flat . Vegetation type: Wyoming Big Sagebrush .

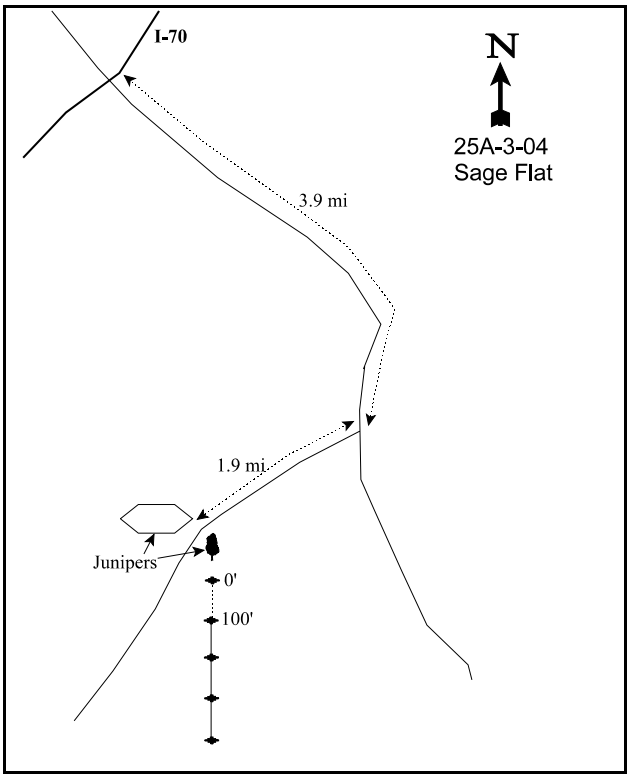
Compass bearing: frequency baseline 180 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

Beginning at the point where the Lost Creek Road passes under I-70 east of Aurora, proceed southeast up the Lost Creek Road 1.2 miles to a truck crossing. Continue past the truck crossing 1.65 miles to a bridge, then 1.05 miles beyond the bridge to a road turning off to the right. Turn right here onto the Sage Flat Road. Drive along this road for 1.9 miles to a slight bend with 5 junipers on the right side. Stop the vehicle 20-30 yards beyond these trees. On the left side of the road is a lone juniper. The baseline begins 15 feet south of this tree.





Map Name: Sigurd, Utah

Diagrammatic Sketch

Township 22S , Range 1W , Section 34

GPS: NAD 27, UTM 12S 4300135 N, 422720 E

DISCUSSION

Sage Flat - Trend Study No. 25A-3

The Sage Flat trend study is located in a sagebrush flat surrounded by sagebrush and juniper covered hills. The flat is dominated by Wyoming big sagebrush with a thick understory of cheatgrass at an elevation of 5,800 feet. The area is used by wintering deer, especially in severe winters when there is heavy snow at higher elevations. The BLM allows sheep grazing in the winter, with both cattle and sheep using it in the spring. However, the Gypsum allotment is not currently used by sheep and there is little use by cows on the site. The road through the flat is well-used, and possible adverse impacts could come from off-road vehicle use. Pellet group transect data from the site in 1999 indicate heavy use by deer with an estimated 125 deer days use/acre (308 ddu/ha). Use by elk and livestock was light in 2004 as pellet group data from estimated 246 deer (608 ddu/ha), 1 elk (2 edu/ha), and 4 cow days use/acre (9 cdu/ha). Livestock use was from the previous summer.

Soils are a fine-textured, loam to sandy loam with a slightly alkaline pH (7.7). Soil depth is moderately deep with an estimated effective rooting depth of just over 15 inches. The soil is not overly rocky on the surface or within the profile, although a gravelly layer is present at about 16 inches. Organic matter is relatively low at 1.3%, with phosphorus at 5.8 ppm. Values below 10 ppm for phosphorus may limit normal plant growth and development. Soil movement is noticeable in a few active gullies on the site, especially along the bottom of the flat. Slight pedestaling is occurring around base of the sagebrush. However, the gentle slope of the area limits erosion to minimal levels. The erosion condition class determined soil movement as stable in 2004. Percent bare ground has slightly decreased since 1991 with a large decrease from 1999 to 2004, due to the increase in cheatgrass cover.

The vegetation of the site is comprised primarily of two species: Wyoming big sagebrush in the overstory, and cheatgrass in the understory. Each species provided roughly 46% of the total vegetative cover in 1999 and in 2004 sagebrush only provided 27% and cheatgrass provided 65%. Together they provided 92% of the total vegetative cover. Wyoming big sagebrush is the only browse species sampled directly on the site besides a cactus species. Sagebrush density was estimated at 2,399 plants/acre in1985, 5,199 in 1991, 3,500 in 1999, and 3,200 in 2004. Differences between 1991 and 1999 are somewhat accounted for because the baseline was in 1999 to increase the sample size for better density estimates for browse species. The higher density in 1991 can also be attributed in part to the very large number of young plants estimated in the population that year (2,866 plant/acre). The population appears to be declining with 26% of the population classified as dying and decadence increasing to 38%. Young recruitment only accounted for 3% of the population, no seedlings were observed, and vigor is only fair. Use has been light to moderate in past years, but in 2004 the majority of the population had heavy use. Leader growth on several plants was measured at 8 inches in 1999 and just over 2 inches in 2004. This population of sagebrush may be at risk with an increase in use, increase in percent decadency, poor vigor, and a significant increase in cheatgrass nested frequency. A greater diversity of browse species is found in the flat, with saltbush (*Atriplex spp.*), greasewood (*Sarcobatus vermiculatus*), and winterfat (*Ceratoides lanata*) occurring along the washes. Junipers are abundant and vigorous on the area surrounding the transect, but do not appear to be spreading into the flat.

The herbaceous vegetation is completely dominated by annuals. Cheatgrass presents a major fire hazard to the big sagebrush population which is not tolerant of fire. If this site were to burn in the future, the area's importance as deer winter range would be lost or greatly reduced. Cheatgrass provided 100% of the grass cover, 89% of the herbaceous cover, and 65% of the total vegetation cover at the site in 2004. It occurs in 100% of the sampling quadrats and will normally prohibit emergence and establishment of sagebrush seedlings. In 1999, perennial grasses were represented by only two species, bottlebrush squirreltail and sand dropseed. In 2004 only bottlebrush squirreltail was found and was observed in only a single quadrat. Forbs are insignificant, and are made up of only annual species.

1985 APPARENT TREND ASSESSMENT

Soil and vegetative trends appear to be downward. Continuous heavy spring grazing pressure from livestock is most responsible for the poor vegetative composition (lack of cool season herbaceous species). Although it provides important early green forage, the shallow rooted cheatgrass provides little erosion control and is a fire hazard. In order to replace this plant with more desirable perennial grasses and forbs and reverse present trends, this site needs a rest from spring livestock grazing and may require some kind of treatment and seeding.

1991 TREND ASSESSMENT

The key browse species, Wyoming sagebrush, has increased in density by 54% without including the estimated 8,000 seedlings per acre. However, 72% of the population is currently made up of young plants, which can be lost quickly with continued drought and competition with cheatgrass. It appears that the cheatgrass has increased from last time, but there is no quantifiable data for the project disregarded the inventory of annual species before 1992. Very few perennial forbs or grasses were encountered on the site. Site understory composition was considered poor for it was mostly annuals.

TREND ASSESSMENT
soil - stable (3)
browse - up (5)
herbaceous understory - down (1)

1999 TREND ASSESSMENT

Soil trend is stable, but is in very poor condition because it depends almost entirely on cheatgrass for protective herbaceous cover. Perennial vegetation has almost entirely disappeared from the site. Herbaceous and litter cover are provided by cheatgrass, which is not as good as perennial cover at holding soils in place. Soil movement is noticeable with pedestaling around the base of sagebrush and some gullies occurring on site. Browse trend is stable. Although deer use is moderately high, Wyoming big sagebrush shows a relatively stable density of mature (actually increased 50%) and decadent plants, good vigor, and mostly light to moderate use. Percent seedling age class is low, but recruitment from young plants is fairly good at 11%. Percent decadency has remained at similar levels between readings, currently it is at 31%. Average height and crown measurements increased between 1991 and 1999. The herbaceous understory trend is down and in seriously poor condition. Perennial species are almost non-existent, with cheatgrass dominating the herbaceous composition. This composition creates a major fire hazard for this winter range site, where the sagebrush population could be lost if it were to burn in the future. The Desirable Components Index rated this site as poor with a score of 23 due to high decadency, high cheatgrass cover, and poor perennial grass or forb cover.

TREND ASSESSMENT
soil - stable (3)
browse - stable (3)
herbaceous understory - down (1)
winter range condition (DC Index) - 23 (poor) Wyoming big sagebrush type

2004 TREND ASSESSMENT

Trend for soil is stable. Bare ground decreased mainly due to an increase in cheatgrass nested frequency and cover, although annual vegetation is not as good at holding soil in place as perennial cover. Some rills and pedestaling are noticeable on the site. Trend for key browse Wyoming big sagebrush is down. Density has decreased and 26% of the population was classified as dying, it will most likely continue to decrease.

Decadency is relatively high at 38%, vigor is fair, heavy use is apparent on most plants, and very little young or seedling recruitment was observed. Trend for the herbaceous understory is down. Cheatgrass increased significantly in nested frequency and percent cover increased from 15% in 1999 to 32% in 2004. Only one perennial species was sampled on the entire transect, which is down from two species in 1999. This composition creates a major fire hazard for this winter range site, where the sagebrush population could be lost if it were to burn in the future. The Desirable Components Index rated this site as very poor with a score of 3 due to high decadency, high cheatgrass cover, and poor perennial grass or forb cover.

TREND ASSESSMENT
soil - stable (3)
browse - down (1)
herbaceous understory - down (1)
winter range condition (DC Index) - 3 (very poor) Wyoming big sagebrush type

HERBACEOUS TRENDS --
Management unit 25A, Study no: 3

Type	Species	Nested Frequency				Average Cover %	
		'85	'91	'99	'04	'99	'04
G	Bromus tectorum (a)	-	-	$_{a}$349	$_{b}$379	15.05	32.11
G	Poa secunda	3	-	-	-	-	-
G	Sitanion hystrix	$_{b}$38	$_{b}$19	$_{a}$3	$_{a}$3	.03	.03
G	Sporobolus cryptandrus	-	-	1	-	.18	-
Total for Annual Grasses		0	0	349	379	15.05	32.11
Total for Perennial Grasses		41	19	4	3	0.21	0.02
Total for Grasses		41	19	353	382	15.26	32.14
F	Alyssum alyssoides (a)	-	-	23	25	.17	.14
F	Erodium cicutarium (a)	-	-	$_{a}$-	$_{b}$36	-	.63
F	Ranunculus testiculatus (a)	-	-	$_{a}$143	$_{b}$267	.88	3.12
F	Salsola iberica (a)	-	-	-	4	-	.00
F	Sisymbrium altissimum (a)	-	-	18	8	1.20	.07
F	Tragopogon dubius	-	1	-	-	-	-
F	Unknown forb-perennial	-	1	-	-	-	-
Total for Annual Forbs		0	0	184	340	2.25	3.99
Total for Perennial Forbs		0	2	0	0	0	0
Total for Forbs		0	2	184	340	2.25	3.99

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 25A, Study no: 3

Type	Species	Strip Frequency '99	Strip Frequency '04	Average Cover % '99	Average Cover % '04
B	Artemisia tridentata wyomingensis	84	86	14.90	13.39
B	Opuntia spp.	1	1	-	.03
Total for Browse		85	87	14.90	13.42

CANOPY COVER, LINE INTERCEPT --
Management unit 25A, Study no: 3

Species	Percent Cover '04
Artemisia tridentata wyomingensis	19.66
Opuntia spp.	.10

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 25A, Study no: 3

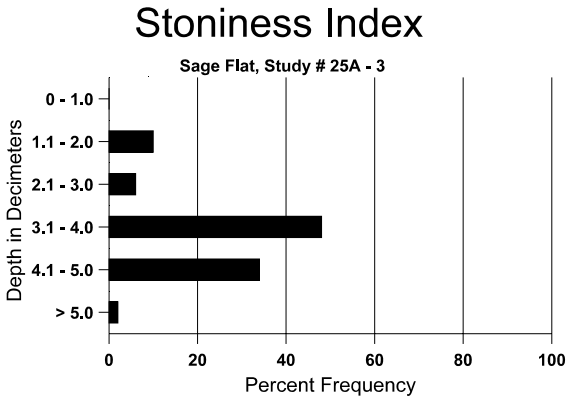
Species	Average leader growth (in) '04
Artemisia tridentata wyomingensis	2.3

BASIC COVER --
Management unit 25A, Study no: 3

Cover Type	Average Cover % '85	'91	'99	'04
Vegetation	8.50	1.25	30.59	49.87
Rock	1.50	1.75	1.32	1.52
Pavement	7.75	19.25	10.25	11.38
Litter	54.25	55.25	37.05	43.91
Cryptogams	0	0	.09	.87
Bare Ground	28.00	22.50	20.09	12.67

SOIL ANALYSIS DATA --
Management unit 25A, Study no: 3, Study Name: Sage Flat

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	ds/m
15.2	64.7 (12.5)	7.7	52.0	28.7	19.3	1.3	5.8	147.2	0.6



PELLET GROUP DATA --
Management unit 25A, Study no: 3

Type	Quadrat Frequency '99	Quadrat Frequency '04	Days use per acre (ha) '99	Days use per acre (ha) '04
Rabbit	35	36	-	-
Elk	-	1	4 (9)	1 (2)
Deer	53	82	125 (308)	246 (608)
Cattle	2	2	6 (14)	4 (9)

BROWSE CHARACTERISTICS --
Management unit 25A, Study no: 3

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Artemisia tridentata wyomingensis												
85	**2399**	-	133	1466	800	-	3	0	33	.83	6	24/26
91	**5199**	8000	2866	1000	1333	-	24	0	26	2	5	21/19
99	**3500**	20	400	2020	1080	540	26	3	31	1	1	26/34
04	**3200**	-	80	1900	1220	460	18	74	38	26	26	22/31
Opuntia spp.												
85	**66**	-	-	66	-	-	0	0	-	-	0	6/6
91	**66**	-	-	66	-	-	0	0	-	-	0	6/13
99	**20**	-	-	20	-	-	0	0	-	-	0	-/-
04	**20**	-	-	20	-	-	0	0	-	-	0	4/9